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AUTOMATION AND TECHNOLOGICAL CHANGE AS VIEWED BY MANAGEMENT, LABOR AND THE FEDERAL GOVERNMENT.

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AUTOMATION AND TECHNOLOGICAL CHANGE AS VIEWED BY MANAGEMENT, LABOR, AND THE FEDERAL GOVERNMENT

By

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Bachelor of Science

The Citadel, 1954

A Thesis Submitted to the Director of the
Navy Graduate Financial Management Program of
The George Washington University in Partial Fulfillment
of the Requirements for the Degree of
Master of Business Administration

June 6, 1965

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PREFACE

Technological innovation in the 1960's should stimulate interest and excitement because the advances which are possible have deep significance and hold great promise for mankind. The improvement of man's standard of living as well as a satisfaction of his basic needs is possible because of progressive changes in technology. These improvements, however, are being marred by predictions by those who see automation and technology today as a serious threat to the very foundation of our society. Workers are resisting new production methods because they are afraid of the unfamiliar. Labor unions are attempting to hold back or slow down technological advances in response to the reactions of their members. Educators are in a quandry as to the best method for preparing our young people for the new job requirements brought about by advanced technology. And the Federal Government finds itself on one hand trying to satisfy the best interests of the Nation and on the other hand the largest single employer in the country with all the inherent problems of management.

This paper has but one purpose: to present and evaluate the views of the three participants who are concerned with automation and technological change in America today--management, labor, and the Federal Government. This paper will show that automation has produced defensive reactions on the part of its participants, even though the benefits are known to be bountiful.

A look at these reactions to automation will reveal that resistance to change and fear are the two stumbling blocks that are slowing down technological progress.

It is the intention of this paper to present only those views that are substantiated by legislative acts, Congressional testimony and factual writings. This kind of empirical approach will present both sides but in all cases the views of the majority will be considered to be the view of the participant.

Chapter I will present background necessary for understanding the impact and trend of current technological progress. It will be necessary, therefore, to study the evolution of the machine and trace its rate of development as well as its impact on man.

In Chapter II the views of management will be discussed and will cover some of the alternatives open to management to solve the short-run effects of automation.

Chapter III will point out factors that have caused labor to view automation with hesitancy. The worker's resistance to change and fear of automation are the worker's worse enemy.

The views of the Federal Government will be presented in Chapter IV and will show why the Government has been forced to step in and attempt to alleviate both the short and long-run consequences of technological change.

Chapter V is a summary and presents some conclusions which were observed in the previous chapters.

CHAPTER I

INTRODUCTION

To provide the background necessary for understanding the impact and trend of current technological progress this chapter will first define what is meant by automation and technological change. Second, a look at the history of the machine will show how it has developed and some of the effects it has had in the past. Third, some of the major technological trends currently facing our Nation will be reviewed to show how they are affecting industries.

Automation and Technological Change Defined

Almost each writer today has his own definition of automation and technological change. For purposes of this paper the thinking of three persons--Charles C. Killingsworth, Richard A. Beaumont, and Roy B. Helfgott--has been selected. In his article, "The Automation Story: Machines, Manpower, and Jobs," Killingsworth sees a distinction between automation, mechanization, technological change, and economic change (See Fig. 1). Economic change includes broad developments such as the growth of the Common Market. Technological change is considered a subdivision of economic change and would include such things as chemical discoveries. One particular type of technological change is mechanization--e.g., the reciprocating engine. And finally

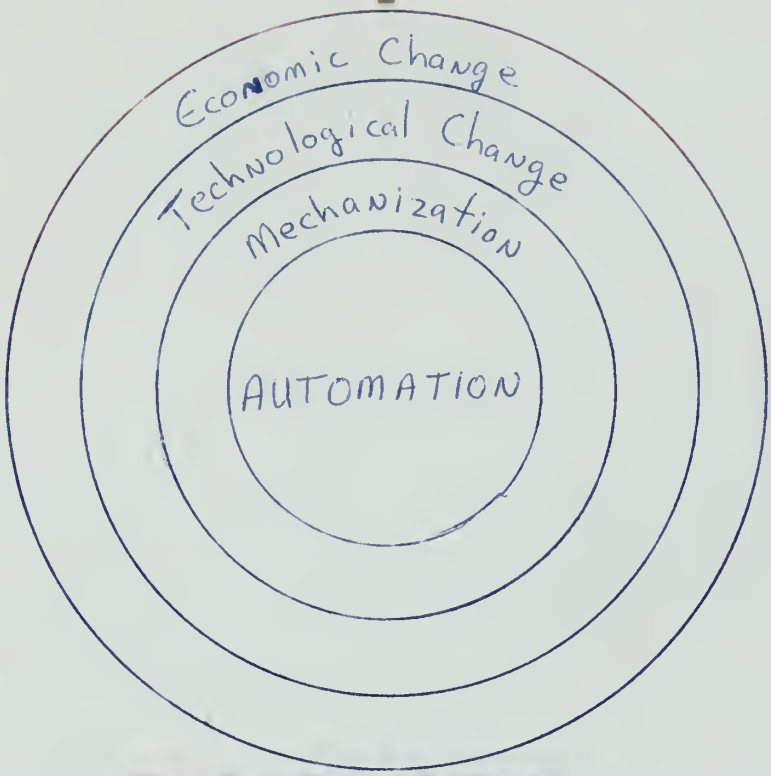

Fig. 1.--Nest of Change

Killingsworth sees automation as a type of mechanization. The automatic oil refinery or steel mill would be examples of automation.[1]

Beaumont and Helfgott presented this definition of technological change after they had surveyed several companies:

> 'Major technological change' refers to the introduction of new or substantially different techniques and equipment, involving a sizable financial investment, for use in the main and closely related operations of a company, plant, or facility, and designed to yield a substantial increase in output per man-hour worked. Such changes would encompass what is commonly referred to as 'automation,' as well as other innovations having pronounced impact.[2]

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[1]Charles C. Killingsworth, "The Automation Story: Machines, Manpower, and Jobs," Jobs, Men, and Machines: Problems of Automation, ed. Charles Markham (New York: Frederick A. Praeger, 1964), pp. 23-25.

[2]Richard A. Beaumont and Roy B. Helfgott, Management, Automation, and People (New York: Industrial Relations Counselors, 1964), pp. 11-13.

Historical Background

During the last thousand years the materialistic and cultural form of our Western Civilization has been greatly modified by the development of the machine. The origin of the "machine age" is not clear in most people's minds because the place where the machine took form in modern civilization had more than one point of origin. Bertrand Gille, in his article "Machines," points out that the monasteries of the middle ages probably made the first major contribution to the development of machinery by their application of the water-mill. The Cistercian order was noted for its elaborate water system that avoided unnecessary labor of getting water into the monastery and increased the time available for meditation and prayer.[3] Lewis Mumford, in his book Technics and Civilization, thinks that the machine had been developing steadily for at least seven centuries before the dramatic changes that accompanied the "Industrial Revolution" took place.[4] Out of the monasteries of the West near the tenth century came probably the first modern mechanical clock. Mumford argues that the clock, not the steam-engine as most historians like to think, is the key machine of the modern industrial age. He sees the clock as a piece of perfection that other machines aspire to be. The analysis of the various types of gears and mechanisms that go to make up an intricate clock contributed

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[3]Bertrand Gille, "Machines," A History of Technology, vol. 2, The Mediterranean Civilizations and the Middle Ages, ed. Charles Singer et al. (New York: Oxford University Press, 1956), p. 650.

[4]Lewis Mumford, Technics and Civilization (New York: Harcourt, Brace and Co., 1934), p. 4.

greatly to the success of different types of machines. There was also a change of mind caused by this new mechanical object. The body became regulated by it. Man ate and slept not because he was hungry or tired but because the clock said it was time to do so. If not the first, this was at least an important technological change in history.[5]

A revolutionary change took place in Western Europe between the 14th and 17th century. The new interest was in the laws of nature and a study of space and transportation. The call of the New World beckoned and necessity bore such inventions as the cannon and attempts at flight by man. The new attitude toward time and space affected the conduct of the army, the daily tasks of the people, and the merchant in his workshop. The incentive to mechanize lay in the profits that could be attained and the capitalist was born out of this desire. Capitalism utilized the machine as a weapon to increase private profit. The social welfare of others was not considered and the machine became a symbol that destroyed the handicrafts of Europe and other parts of the world because of the possibilities of profit.[6]

The Industrial Revolution in England radically altered the structure of the community. During these seventy years, labor, land, and capital were co-ordinated to transform a nation of farmers into a powerful industrial society. The growth of production associated with this period was in the form of power, new machinery, or new knowledge derived from science. The rapid

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[5]Ibid., pp. 12-18.

[6]Ibid., p. 27.

growth of the population, higher standards of living and exploitation of new sources of raw material were also a few of the many factors that influenced the structure of the society. In his book, The Industrial Revolution 1760-1830, T. S. Ashton points out that the Government played a less active part, the individual a more active part in affairs at stake and that:

> Ideas of innovation and progress undermined traditional sanctions: men began to look forward, rather than backward, and their thoughts as to the nature and purpose of social life were transformed.[7]

But the capacity of technology to alter the possibilities of life also reach an economic viewpoint. In his book, Wealth of Nations, Adam Smith conceived of technical improvement and advances as a means of extending the market, not only by cheapening the price of the goods, but also by making labor more in demand.[8] Smith's views were widely shared by most during the early stages of the Industrial Revolution. There was some doubt though, especially by the working class, if the machines were really what was needed by society. The doubt did not question the ability of the machine to increase the output of goods with less work. Rather, it was concern for the demand for labor.[9] This was not the first case that had raised the question as to

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[7]T. S. Ashton, The Industrial Revolution 1760-1830 (New York: Oxford University Press, 1964), pp. 3-4.

[8]Adam Smith, Wealth of Nations (New York: Oxford University Press, 1928), cited by Robert L. Heilbroner, Automation and Technological Change, ed. John T. Dunlop (Englewood Cliffs, N. J.: The American Assembly, Columbia University, 1962), p. 8. Cited hereafter as Automation and Technological Change.

[9]Robert L. Heilbroner, "The Impact of Technology: The Historic Debate," Automation and Technological Change, p. 9.

whether the increasing demand for machinery might not actually decrease the demand for labor.

David Ricardo was one of the first well-known economists who came out against machinery. He saw the capitalist investing part of his money that would normally go to his workers into machinery that would increase production. The decrease in capital would not allow him to hire more workers and would, in fact, reduce the normal level of employment. Those who stayed reaped the benefits but there was not automatic benefit to those who lost their jobs. It can be said then that the Industrial Revolution of the 18th century created the factory but it also separated management and labor in production of goods.

At the same time the Industrial Revolution was occurring in England and Western Europe, the technology of the New World was also being reshaped. American ingenuity had separated the new Nation's dependence on Europe by the time of the American Revolution. This war, as has been the case in all of our wars, brought forth a number of new technological developments such as new techniques of wool processing, spinning, tanning and leather production, and scientific advances made by great men such as Franklin, Washington, Rush, Rittenhouse, and many others.[10]

The period after the Revolutionary War and the Industrial Revolution found management still trying to find ways to perform intricate and laborious tasks with a minimum of labor. A dream of that time was automatic manufacturing--a process or system

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[10]John W. Oliver, History of American Technology (New York: The Ronald Press Co., 1956), pp. 101-120.

that would require little if any labor. The development of textile machinery is a classic example of the evolution of an integrated process that was far along toward total automation by 1830. Oliver Evans, a mechanical genius of the post-Revolutionary War period, is cited as having built the first automatic factory about 1785.[11] Evans also made a valuable contribution by his improvements of the steam engine first developed by James Watt in 1765. This harnessing of steam allowed many industries, particularly transportation, to make rapid leaps forward in terms of progress and expansion.

The period from the Civil War to 1900 was one that placed America in the family of nations. Machine technology advanced so rapidly that production surpluses sought an outlet beyond our borders. This was the period that saw the steel industry blossom into a mighty giant, the rise of the giant oil companies, and the introduction of the automobile. Probably the greatest development was the harnessing and utilization of electricity which "gave man his greatest mechanical servant."[12]

No great progress had been made on automatic manufacturing since Evans' grain factory until Henry Ford's revolutionary moving assembly line. This procedure moved technology into another phase. By splitting into 29 operations what had been done by one man, the assembly time of magnetos was reduced from

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[11]James R. Bright, Automation and Management (Boston: Graduate School of Business Administration, Harvard University, 1958), p. 13.

[12]Oliver, p. 295.

20 minutes to 5 minutes per unit.[13] Mass production, as we know it today, was born. Future refinements of this system are involved in almost every manufacturing process today.

As with the past wars, World War I also speeded up the technological changes of America. The speed with which food and supplies were produced and transported to Europe was due to the increasing use of mass production techniques and stands as a tribute to the soundness of American know-how.

The advancing technology of the war, however, had repercussions in the form of post-war unemployment which reached its peak in 1921. Employment in manufacturing rose to a high point in 1919, and volume of production to a still higher level, but both fell off sharply by 1921. During that year the idleness of wage-earners was so widespread that President Wilson set up a President's Conference on Unemployment, the first of its kind in the history of our nation.[14] The old problem of doubt that prevailed in 1830 returned to the surface, and again the doubt was concerned with the machine's ability to displace labor.

The industrial depression which began in 1929 was much greater than that of the post World War I days. The labor unions which had lain dormant for many years, suddenly sprang to life. The Federal Government made good use of its research facilities and the reports coming out of governmental agencies spread information about new productivity in industry and agriculture

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[13]Bright, p. 14.

[14]Mary L. Fledderus and Mary van Kleeck, Technology and Livelihood (New York: Russell Sage Foundation, 1944), p. 198.

to try to bolster the sense of insecurity which prevailed.[15] The phrase "technological unemployment" was heard more and more frequently. Studies and experiments were in progress in hopes of achieving "full employment" when World War II began. Like the past wars, this one provided full employment and productivity and increased the rate of technological progress to an even faster speed. It also proved that superior science and technology could win a war and mass production of products reached its peak during this era.

The 1950's saw a new phase of technology, one that added automatic control and decision making. It turned the factory from a haphazard collection of machines into a single, integrated unit. Automation is the word coined for this process. One type of automation is commonly referred to as "Detroit automation." It is a refinement of Henry Ford's assembly line but many more automatic functions are incorporated.

Automation is based on the principles of the three stages of technological growth recognized at the present. It embodies the mechanization of the 18th Century Industrial Revolution, the continuous mass production principle of the early 20th Century and the automatic control principles utilized since World War II.[16] Automation is a concept of manufacturing that requires that the entire production process, from raw material

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[15] Ibid., p. 7.

[16] U.S., Congress, Senate, National Commission on Automation and Technological Progress, Nation's Manpower Revolution, Subcommittee on Labor and Public Works, 88th Cong., 1st Sess. (Washington: U.S. Government Printing Office, 1964), p. 3.

to final product, be analyzed so that every operation efficiently contributes the most to the achievement of the goals of the organization.

Another type of automation falls under the heading of computer technology. There are many variations and kinds of computer applications, from those that run power plants entirely to the automatic electronic accounting system. The foundation of all these achievements of computer technology is cybernetics--the science of communications and control. Cybernation in the 1960's has a tremendous capability to change the way we live, even in today's modern and sophisticated environment. If utilized to its full potential, it could set the pace that will make this period in which we live rank ahead of the Industrial Revolution in regards to technological progress.

Current Technological Trends[17]

Automation and technological changes currently underway are affecting many industries and occupations. The following is a brief review of some of the major technological trends and is intended to indicate the nature of these trends.

Electronic Computers

The electronic computer is turning out to be one of the greatest innovations of this century. Use of the computer to process data has both employment-reducing and employment-generating effects. In business data processing, the routine

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[17] U.S., President, 1963- (Johnson), Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training (Washington: U.S. Government Printing Office, 1964), pp. 52-61. Cited hereafter as Manpower Report of the President, 1964.

tasks of the clerical staff are being reduced by electronic data processing (EDP). This reduction in human skills has the effect of reducing the number of clerks required as compared with manual processing of the data. Computers also tend to reduce employment in the automated factory and middle managers are also feeling the impact of the computer's ability to accomplish routine decision-making.

On the other hand, computers have created many types of jobs such as those of programmers, systems analysts, and so on.

Instrumentation and Automatic Controls

Another rapidly developing area of technology is the use of instruments for measurement, sensing and control. Through centralization of instruments on one console, some processing plants are now able to have remote control of operations. This advanced type of automation is still in the early stage of development but its potential is great. Labor savings for management is usually the result of process control equipment but to handle advanced control systems requires highly skilled and educated workers.

Numerical Control

This is a technique used to operate machine tools by computer. Through its use uniform and identical parts are assured, a prerequisite in building aircraft or any other major metalworking industry. Its use is being expanded to other industries and where installed substantial labor savings have resulted.

Communication Technology

This field has had far-reaching achievements such as the communications satellite, direct-dialing telephones, closed-circuit TV systems. The new techniques of communication are opening up a vast requirement for technical personnel while at the same time greater automation of operations is restricting or reducing employment of the lesser skilled workers.

Improvement In Machinery

Bigger and more complex machines are helping increase productivity in many industries. In order to compete management seeks new ways of bottling, packaging, and so forth. Most of the technological advances involve combining operations so that the process is more automated. Such improvements in machinery are designed to be cost saving, generally through a reduction in labor requirements per unit of output.

Summary

It has been pointed out how incredibly slow was the technological progress in all the early stages of man's development and how rapid that rate of development has accellerated in the later stages. No one can deny that machines and modern technology have made nations strong, increased the life span of man, and raised standards of living. Technology has also changed man's outlook, his way of living and sometimes forced him to be a slave of the machine he created. The trend of technological progress is, however, not only one of increasing productivity and economic growth but also a continuing substitution

of physical energy for human labor in industrial activities. The cries of "technological unemployment" which started with the Industrial Revolution is with us again in the 1960's. The three parties concerned with technological change are management, labor, and the Federal Government. The next chapters will try to point out the problems that face these three groups and their points of view towards technological progress in the 1960's.

CHAPTER II

THE VIEWS OF MANAGEMENT

One of the differences in today's technology from past developments is the combination of the various modern techniques which introduces a new process into methods of production. This new process can have varying effects on the worker and the firm. It may: (1) reduce the total number of workers while production (sales) remain unchanged, (2) increase production with the same or slightly lower work force, or (3) increase production with the help of a higher work force.[1] In most cases the latter has normally been the long-run result of introducing changes. The short-range effects, however, have been a reduction in the number of workers affected by the equipment. This chapter will discuss the views of management regarding the short and long-run effects of modern technology. Some of the alternatives open to management in trying to solve the short-run effects are also covered.

The Goal of Management

Every business organization has two primary purposes. The first is that of trying to accomplish something that will be useful to, or desired by, persons external to the organization.

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[1]S. Moos, "The Scope of Automation," Economic Journal, LXVII (March, 1957), p. 27.

The second is to take in more money than its costs.[2] Some organizations may or may not accomplish one or both of these primary purposes satisfactorily or efficiently. But, along with the desire to make a profit, every organization has a basic objective to remain viable--the drive for continued existence. With today's economy being pushed by rapid technological change, management must be youthful in its skill and flexibility or it will not be able to compete successfully. This competition involves new products, new techniques or production, and any method or procedure that will save or reduce costs and expenses.

Effects of Automation on Management

By automating, management has definitely been able to increase output per man-hour (See Fig. 2). Although the trend does not appear to be great, a small increase each year can save management a large sum of money on labor costs/unit. Automation, like any other form of technological progress also has had impacts in other areas besides labor reduction. Management responsibilities and decisions have changed and management is less flexible than before because of higher investments and more stringent schedules.

A few years ago, management and administrative staffs comprised only a small part of total labor costs. The trend in recent years has been a definite increase in the percentage and total numbers of white-collar workers. Increasing the

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[2]Joseph W. McGuire, Business and Society (New York: McGraw-Hill Book Co., 1963), p. 158.

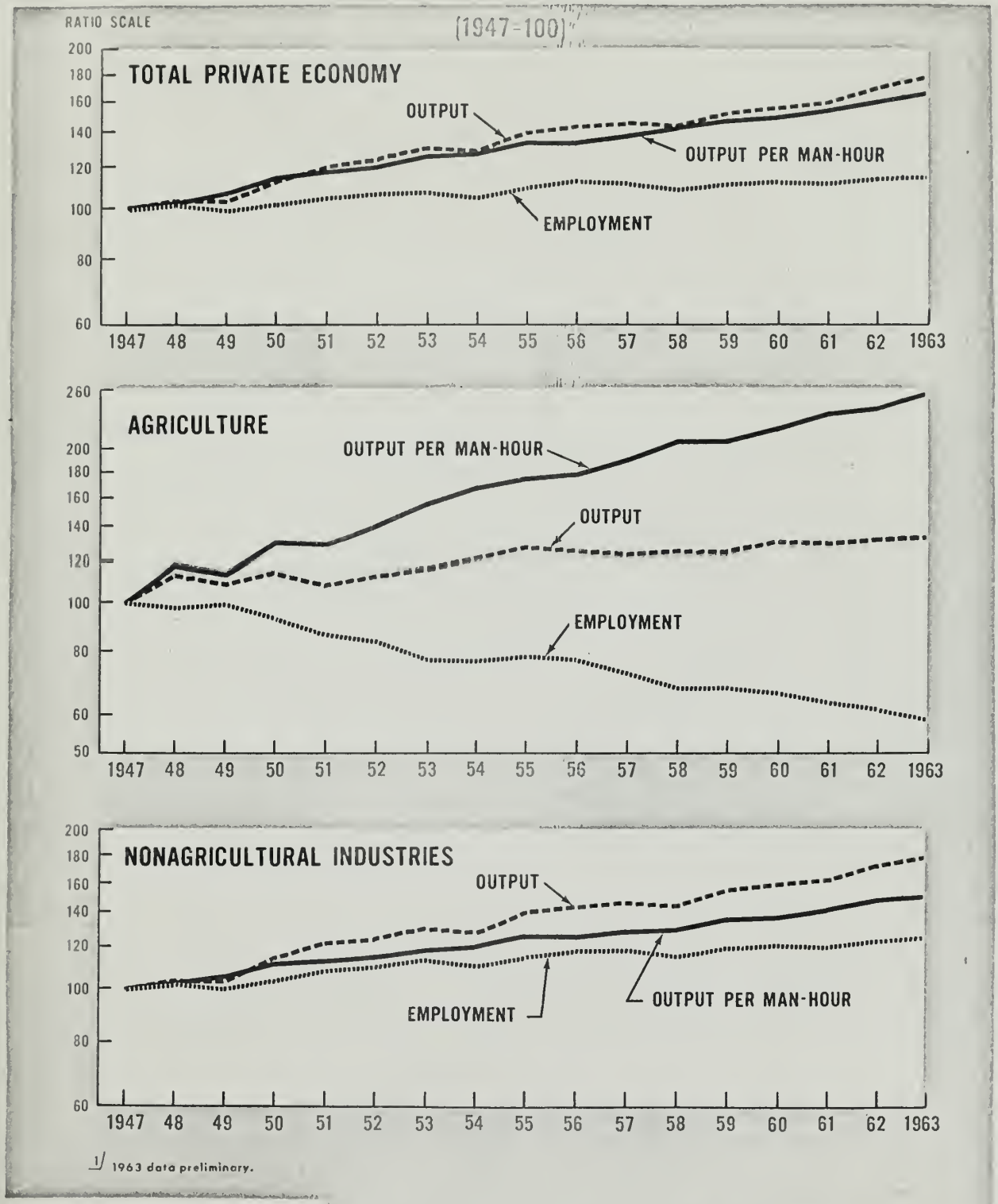

Fig. 2-- INDEXES OF OUTPUT, EMPLOYMENT, AND OUTPUT PER MAN-HOUR, 1947-63 1/

Source: Manpower Report of the President, 1964, p. 48.

effectiveness of management and administration has become a major concern to all business firms. Norbert Weiner says we should make more "human use of human beings." He believes that we should strive for more use of high level decision-making abilities in management and not waste human resources by pushing pencils and other menial tasks.[3] One area that wastes human resources is in the office. In 1910, only one worker in twenty was a clerk. In 1950, the ratio was 1 in 8 and increased to 1 in 7 in the 1960's.[4] Automation promises to reverse this trend and computers in the office are taking over the routine jobs of the clerical work force.

Another effect is the alteration of administrative processes by doing many things never before possible. Management now has a tool--the computer--which will allow a much clearer picture of its overall operation through the use of an increased information system. According to Harold Leavitt and Thomas Whistler, information technology will have four effects on management: (1) planning will be transferred from middle management to top level specialists, (2) large industrial organizations will recentralize with more of the creative functions being taken on at the top level, (3) there will be a radical reorganization of middle management, and (4) the line separating the middle and top management levels will be more

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[3]Weiner, Norbert L, The Human Use of Human Beings, (Boston: Houghton Mifflin Co., 1954), 347 pp.

[4]U.S. Dept. of Labor, Adjustments to the Introduction of Office Automation, Bureau of Labor Statistics Bulletin No. 1276 (Washington: Government Printing Office, 1960), p. 1.

sharply drawn.[5] There are those who challenge such a forecast as this and contend that heuristic programming will not come about as easily as predicted. In his book, The New Science of Management Decisions, Herbert A. Simon observed that man would still have the comparative advantage over the computer in many areas and would be used in those areas.[6] Both sides will contend, however, that the decision-making process of management is changing and becoming more scientific through advances in technology.

Changes in Decision-making

The raw material of decision-making is information. It is the life blood of the direction and control of management's operations. Added to the manager's contribution of ideas and experiences, information generally leads to a plan of action and, ultimately, to decision and a directive for the implementation of the plan. In order to make the correct decision, management must first have quality information that will be relevant, precise, complete, and timely. The application of sophisticated techniques of quantitative analysis such as linear programming, game theory and so on allow good quality information. But the information must also be used properly if a successful decision is to be made. This processing of data is done by computers. Most of the applications of automated

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[5]Harold J. Leavitt and Thomas Whistler, "Management in the 1980's," Harvard Business Review, XXXVI, n. 6, (November-December, 1958), pp. 41-48.

[6]Herbert A. Simon, The New Science of Management Decisions (New York: Harper Bros., 1960), p. 153.

decision-making are concerned only with programmed decisions at the present time. Although the computer was first viewed as a device for doing rapidly and efficiently what managers had been doing all along, it is now seen as a means of enlarging the whole range of decision-making.[7]

The ultimate information goal entails a total management information system which will integrate the entire activity of the firm--from research and development through production and distribution to financial results. In order to reach this utopia, management must prepare and plan for any changes brought about by advancing technology. The machinery for tying together all the parts that make up the total system is the computer and its related components. The equipment that is available on the market today is capable of meeting almost every requirement for gathering, processing, recording, communicating, and reporting business data. Processing speeds are supersonic and challenge the ability of man to create the source data or to fully digest the results. However, man has not yet completely adjusted himself to the computer age. A recent survey of companies with long computer systems experience indicates that the major problem in the transition to electronic data processing is not technical but managerial and organizational.[8] Preparation and planning prior to any technological change are necessary if management is to avoid the pitfalls of others.

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[7]Melvin Anshen, "Managerial Decision," Automation and Technological Change, p. 78.

[8]John T. Garrity, Getting the Most Out of Your Computer (New York: McKinsey and Co., 1964), p. 12.

Management Planning

The manager of daring and imagination who relied on intuition and vision or matched his hunch against his experience has become a technological casualty. The task of management has changed and the top executive can no longer have knowledge of all the details that are happening in the firm. Automation has elevated long-range planning to a role of major importance and emphasizes the need for management to think less in terms of individuals and particular problems and more in terms of groups and over-all requirements. Professor Bright said of his study of automated plants, "The outstanding conclusion of this study is that automation puts a great premium on managerial planning."[9]

Planning takes many forms--it may consider a single occurance or it may be a continuous process. Planning also can be involved in sales forecasting, budget analysis, personnel requirements, and so on. Technological changes, such as conversion to electronic data processing or automatic numerical control, will affect the whole organization from management to worker. The adjustments to the new process or change can be softened if management properly plans for the change. Because most technological advances in the factory or office have their greatest effect on the worker, manpower planning has become a very important part of management's responsibility. Manpower studies, contrary to one's first thoughts about the subject, can

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[9]Bright, p. 276.

show that more workers are needed instead of less.[10] Under-employment can have almost as many disadvantages as unemployment. The majority of technological changes that have affected the worker are in the form of layoffs, displacements, interplant transfer and fear in the worker of these things happening to him. Communications breakdown within the organization has been one of the prime factors contributing to this fear.

The Communication Process

When management proposes any technological change three factors are involved: (1) the scope of the change, (2) the speed with which it is to be implemented, and (3) the climate of labor-management relations.[11] Communications programs within the organization can cope with these circumstances if they give enough advance notice of an impending technological change. Early notice will allow workers to condition themselves to the inevitable in the case of displacement or to evaluate the alternatives open to them, such as to transfer to another part of the plant, severance pay, or early retirement. This advance notice will curtail any false rumors that may destroy or hurt the morale of the entire plant or department. "The truth, no matter how harsh, engenders less fear and is less damaging to morale than the uncertainties or speculation based on gossip, . . ."[12]

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[10]For an interesting article on this subject read "Management Brain-Power Needs for the 1970's," by Keith Davis in Journal of the Academy of Management (August, 1960), pp. 125-127.

[11]Beaumont, p. 278.

[12]Ibid., p. 279.

Since there will be a reaction by the union to an impending change that affects workers, advance notice will allow any violent arguments the union might have to be aired prior to the actual change and usually a working compromise can be attained. Management, however, will not normally notify labor leaders who have taken steps in the past to obstruct any move made by management. This will antagonize the unions, but where relations are already strained management believes this is the most beneficial course of action, if the technological change is to take place in the shortest time and least cost to management.

Training Programs

Changing technology demands that the new entrant into the labor force be better prepared than was required a few years ago. Due to the environment in which they live, the youth of 1965 can meet this demand. This better preparation allows today's youth to switch jobs with greater ease. The labor force, however, is not made up entirely of young people and the older worker must be retrained if he is going to fit into the new technology.

To help ensure a smooth shift-over to a new process or procedure, management has several courses of action available. It can: (1) follow a policy of reducing the work force through attrition, (2) provide retraining, or (3) provide other jobs.[13]

The policy of reducing the work force through attrition is management's way of accepting part of the responsibility for the displacement of present workers. Management is willing to

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[13]Jules Backman, "Cushioning the Impact of Technological Change," Labor Law Journal, XIII (September, 1962), p. 736.

guarantee employment of the regular workers until they retire, die, resign, or are discharged for cause. But, if a new worker is not required to replace the present one when he leaves, management does not believe it should be required to replace the worker.[14]

Another action management can take is to retrain the workers affected by the technological innovation. This might be costly, depending on the supply of the local labor market, but would help maintain job security for the workers. Retraining programs appear to provide a simple and obvious means of re-equiping workers for new jobs. However, some workers are not interested in being retrained while others may not have the basic education required.[15]

Where employees are not able to meet the education requirement for the new job, management has two choices: (1) provide other jobs, or (2) dismiss the worker. Labor contracts may not allow the latter and this leaves management with the requirement of finding a place for the uneducated worker, most of whom are older than the average and who will not be a burden to management for long lengths of time due to their age. Early retirement benefits can usually reduce a percentage of the "unwanted" workers.

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[14]For a current dispute on this subject read, "New York Newspapers Under the Gun Again," Business Week, n. 1855 (March 20, 1965), pp. 111-114.

[15]Backman, p. 740.

Summary

The same dream that captured the imagination of management during the Industrial Revolution is becoming a reality--automatic manufacturing. Management is still constantly looking for new ways to perform intricate and laborious tasks with a minimum of labor. The increased standard of living derived from modern technological innovations has also increased the wages of the worker. Pressures from both domestic and foreign competitors have made it necessary for management to "find a better way." Modern technology and changes in production methods are allowing management to increase production and lower costs--sometimes through the reduction of labor. Where feasible, management tries to retrain its present workers. If educational requirements are not matched with the worker's capability, however, management will release the worker--if possible.

The installation of new technological innovations also is expanding management's outlook. It no longer thinks only of the individual but is forced to look at the "whole" organization if it is to maintain its competitive position. Some mistakes have been made by management but it is known that long-range planning is the key to success. Because of this long-range outlook management has, in some cases, ignored the short-run consequences. This lack of foresight and disregard for the present has caused considerable reactions from the worker.

The role of labor-management relations also plays an important part in molding management's viewpoint toward the effects of automation. This topic, however, will not be

discussed until the end of the next chapter after labor's point of view has been expressed.

The main desire of management goes back to the goal of the organization--to remain viable. Technological progress is one answer to this desire.

CHAPTER III

THE VIEWS OF LABOR

"America needs continuing technological progress. But . . ."[1] These words of George Meany express the over-all views of labor regarding the impact of automation and technological change on the labor force. Why is labor hesitant to accept technological innovations when history will bear out the fact that they raise the standard of living of all and reduce the physical labor required of the worker to complete his task? This chapter will point out factors that have made labor take this view, such as the changing composition of the labor force and the shifting demand for labor. The impact of changing technology will then be discussed showing how job security is the most important aspiration of the worker. Automation can destroy this security and the worker's fear of unemployment has become very real.

In many cases the worker will not or cannot make the adjustment back to the "employed" ranks. The reasons why the worker resists change and methods to ease the adjustment will be covered in the last section.

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[1]U.S., Congress, Joint Economic Committee, New Views on Automation, Subcommittee on Automation and Energy Resources, 86th Cong., 2d Sess., 1960, p. 536.

The Labor Force[2]

In order to better understand the views of labor, a look at the current trends of the labor force is necessary. Because of a changing and shifting labor force serious problems develop if employees are dismissed because of technological change. Automation cannot be blamed entirely for the shifting demand, but it is a major contributor.

Size and Composition

The predominant factor of the increase in the labor force[3] during the 1950's was the high percentage of older workers (ages 45 to 64). Young people (ages 14 to 24) accounted for less than 5 percent of the increase in workers during the decade due to a low birth rate during the 1930's on one hand and the sharp post-war uptrend in school and college enrollment.

The growth pattern of the "sixties," however, is entirely different. Even though the 1950-60 expansion of the labor force far exceeded that of any previous decade, the increase projected for the 1960's is more than half again as large as that experienced over the preceding 10 years (See Fig. 3). Young people are expected to increase their number in the labor force by a rise 17 times as great as over the previous decade.

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[2]U.S., Congress, Senate, Committee on Labor and Public Welfare, Toward Full Employment: Proposals for a Comprehensive Employment and Manpower Policy in the United States, 88th Cong., 2nd Sess., 1964, pp. 22-24. Cited hereafter as Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964.

[3]The labor force includes all persons, 14 years of age and over, who have a job or who are actively seeking a job.

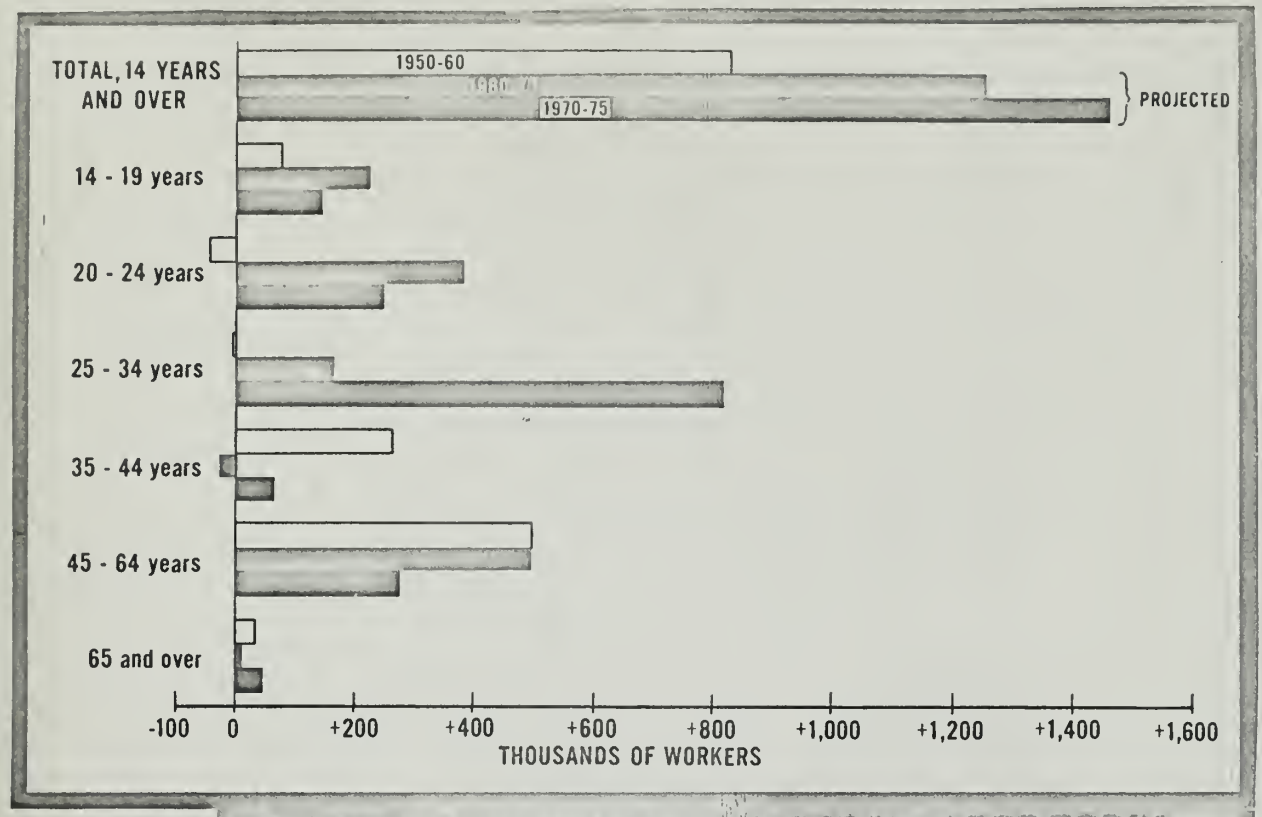

Fig. 3-- AVERAGE ANNUAL CHANGE IN TOTAL LABOR FORCE BY AGE GROUP, 1950 TO 1975

Source: Manpower Report of the President, 1964, p. 36.

Actually, the impact is accelerating. By 1970, the annual influx is predicted to reach 3 million--compared with 2.6 million in 1964 and 21 million in 1960.

Even though the employment of the young people entering the work force during the 1960's is high, there is also another area that should be called to the reader's attention. Due to both aging of persons in the labor force, and the entrance or re-entrance of adult women, the 45 to 64 year age group will again start to increase in the later 1960's. In 1970 this age group will account for more than a third of the labor force. Workers in this pre-retirement age group who do not have the proper

education or training, or who lack the necessary resources for moving or relocating to other areas in search of new jobs, will face serious readjustment problems when they are dismissed because of technological change, industry relocations, or sudden changes in demand.

Of the 26 million young workers who will enter the labor force in this decade, only a little more than a fourth will enter college. This means that roughly three out of four entrants during the 1960's will have high school educations at most. These young people will be greatly handicapped if modern technology continues its rapid acceleration. Many older workers are also handicapped by the fact that their education was inadequate or is presently out-of-date if they are seeking new jobs. In 1960, nearly three-fifths of the adult population had less than a high school education (See Fig. 4).

It can be seen, then, that the educational implications are grave both to those already at work as well as to the new labor force entrants. Although the educational level of the labor force has been improving recently it is only because of the higher level of education of the incoming entrants and the more poorly educated workers who have been retiring from the labor force.

The Changing Demand for Labor[4]

Goods-Producing Industries versus Service-Producing Industries

The demand for labor is shifting to service jobs within the economy. The proportion of all workers in goods-producing

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[4] Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964, pp. 25-27.

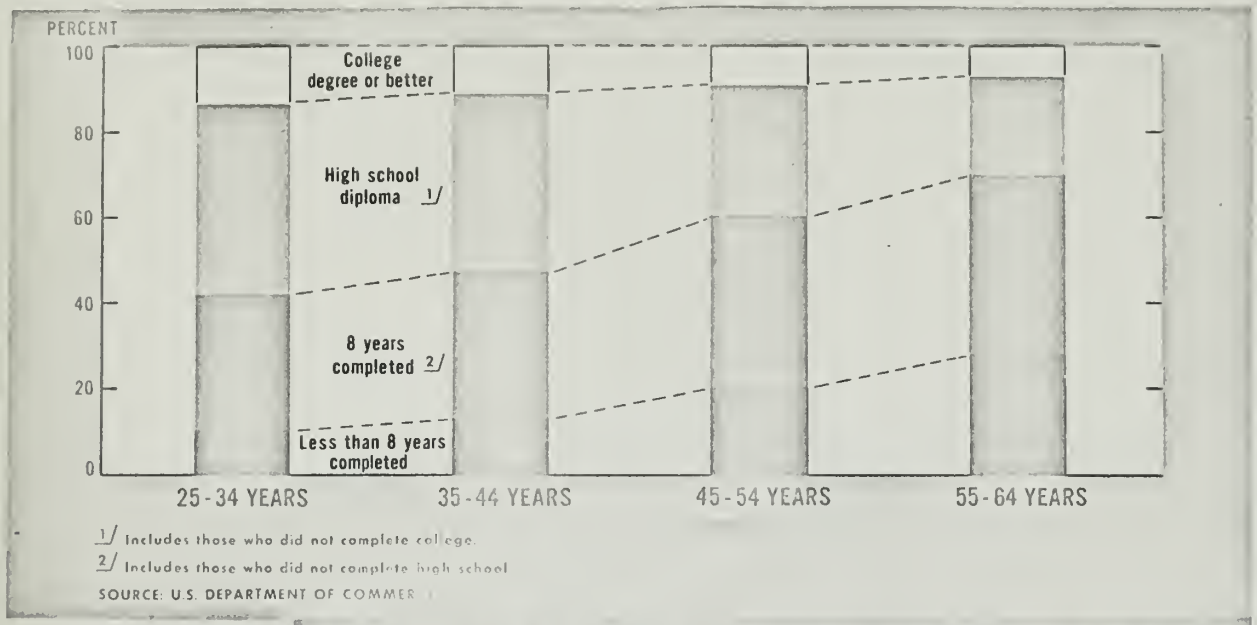

Fig. 4-- DISTRIBUTION OF THE LABOR FORCE 25 TO 64 YEARS OLD, BY EDUCATIONAL ATTAINMENT AND AGE GROUP, 1960

Source: Manpower Report of the President, 1964, p. 73.

industries (transportation, mining, manufacturing, and construction) declined from 51 percent in 1947 to 46 percent in 1957, and fell to about 40 percent in 1963. The alarming fact in the shift of the labor force is the rapid rate of the shift. The Department of Labor states that the reason for the decline in the goods-producing industries is a combination of modest growth in output and productivity changes which are higher than the average for the economy.[5]

In contrast, the rate of job increases in service-producing industries (trade, service, all governments, finance, real estate, and insurance) have been increasing significantly.

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[5]Manpower Report of the President, 1964, p. 20.

the main contributors to this growth have been state and local governments in their area of school systems. The payroll growth of the service-producing industries has also been higher than that of the trade industries. This is probably helping the shift by increasing the desirability of switching into the higher paying industries.

White-Collar versus Blue-Collar Jobs

Another shift in the composition of the working force is the increase in the number of white-collar workers among industries. Improvements in management and marketing techniques coupled with the growth of the services industries increased the share of white-collar employment from 31 percent in 1940 to 44 percent in 1964 (See Fig. 5). These figures are very broad and they obscure opposing trends for specific occupations. Nevertheless, the generalization of increasing demand for more professional and technical workers is borne out by the Labor and Commerce Department statistics.

Changing Technology and the Worker

One of the basic drives of man is security. For the worker this means feeling safe that he will continue to maintain a steady income for the foreseeable future. This secure feeling has been disturbed, however, because of the "labor-saving" possibilities inherent in most technological innovations. At the time of their introduction, these changes in techniques or machinery can have a number of impacts on the worker. Besides their affect on wages, they can (1) displace the worker, (2) dismiss

(Percent)					
Major occupation group	1900	1930	1940	1960	1964[1]
Total	100.0	100.0	100.0	100.0	100
White-collar workers	17.6	24.9	31.1	42.3	44
Blue-collar workers	35.8	40.2	39.8	39.6	39
Service workers	9.0	7.8	11.7	11.7	13
Farm workers[2]	37.5	27.0	17.4	6.3	5

[1]Estimated from Monthly Labor Force Survey data, using 1960 Census data as benchmark.
[2]Farmers, farm managers, farm foremen, and farm laborers.

Source: Economic Report of the President, 1965, p. 122.

Fig. 5.--Distribution of the economically active civilian population, by major occupation group, selected years, 1900-64

the worker, or (3) cause a displacement of skills. As an example, the introduction of the linotype was followed by a large increase in the demand for printed matter. The older compositors were not able, however, to work as machine operators and there was a surplus of workers with their skill.[6] A similar situation resulted when the semi-automatic bottle machine was introduced. The machine only affected those workers on the wide-mouth bottles. The labor union and its members, however, were concerned because it displaced a few workers although the overall impact was an increase in the total number of

[6]George E. Barnett, "Machines and Labor," Quarterly Journal of Economics, XL (November, 1925), p. 119.

employees.[7] This philosophy is still labor's viewpoint. "Labor unions have not concentrated on the long-run effects, but on the short-run consequences."[8] They have taken the stand that technological unemployment does have a serious impact on the welfare of the displaced worker.

The Personal Impact of Unemployment

Although the causes of excessive unemployment may be uncertain, its effects are not. The total work force has been increasing, and the nation has enjoyed one of its longest prosperity periods these last four years. But these figures are unimportant to the displaced worker. With automation and changing technology increasing every year, the worker is prone to blame automation for his inability to maintain a job. Current statistics cannot prove or disprove that automation is the main culprit. The monthly Bureau of Labor Statistic figures can, however, show what is happening to the work force and suggest areas that need to be watched and corrected.

In the meantime, the displaced worker is undergoing severe financial hardship as a result of permanent layoff. Many who are able to find jobs do so at a loss of wages.[9] Not only is the impact of extensive unemployment far-reaching financially, but

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[7]Philip Taft, "Organized Labor and Technological Change: A Backward Look," Adjusting to Technological Change, ed. Gerald G. Somers, Edward L. Cushman, and Nat Weinberg (New York: Harper & Row, 1963), p. 27. This book will be cited hereafter as Adjusting to Technological Change.

[8]Ibid., p. 29.

[9]Richard C. Wilcock and Walter H. Franke, Unwanted Workers (London: The Free Press of Glencoe, 1963), p. 69.

the social and psychological effects are severe on the displaced workers and their families. Since most older workers are married, the loss of income during lengthy unemployment means a serious curtailment of living standards. Unemployment insurance and severance pay are usually the only two forms of additional income during the unemployed period. Severance pay, however, usually is consumed quite rapidly, to pay old debts and living expenses, and the sole source of income then becomes unemployment insurance.

Psychological problems associated with long-term unemployment sometimes causes traumatic shock:

> Facing a labor market in which jobs were scarce was a difficult experience for many, particularly for those who suddenly discovered they had become "old" in the eyes of potential employers.[10]

In many instances the unemployment problem is local in nature due probably to the dislocation of the major industry in the area. If this is the case, why doesn't the worker move to surroundings that are more conducive to employment for his particular skills?

Resistance to Change

The average worker is very reluctant to leave familiar surroundings. This resistance to change is quite normal even if prospects for improved employment exist elsewhere. As long as unemployment remains general, relocation of surplus labor will be resisted both by businessmen at the point of origin who object to the loss of customers and by the workers in the new community

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[10]Wilcock, p. 92.

who resent the increased competition. Geographic mobility--moving from one place to another--is the type of mobility "that is the last resort of the worker."[11] Most workers will not change their places of residence until they have tried new employers or even new occupations.[12]

There are many factors which have effects on the propensity of the worker to relocate in another geographic area. Mobility studies show these to be age, homeownership, job opportunity, marital status, occupation, ethnic origin, sex, and war.[13]

Ideally, a country's labor force should be able to match geographically and occupationally. "In practice, however, the specific interests of the employers and employees do not coincide with the interest of the economy as a whole."[14]

This resistance to geographical change is also carried into the factory. Just the fear of being replaced by machines is enough to cause many workers to oppose any production changes that management might introduce. If management does not inform the workers of the effects of the new machine, the workers will resist the change with all their might. "People tend to support

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[11]Jacob J. Kaufman, "Labor Mobility, Training, and Retraining," Studies in Unemployment, U.S. Senate, Special Committee on Unemployment Problem, 86th Cong., 2d Sess., 1964, p. 345.

[12]Herbert S. Parnes, Research on Labor Mobility (New York: Social Science Research, 1954), p. 79.

[13]Ibid., pp. 55-82.

[14]Gertrude Bancroft and Stuart Garfinkle, "Job Mobility in 1961," Monthly Labor Review, LXXXVI, n. 8 (August, 1963), p. 903.

that which they create."[15] This statement is particularly true in today's rapidly changing world.

Softening the Impact

All of the above factors have shown the pressures that are being exerted on the worker. These have the capability either collectively or individually, to jeopardize his job or destroy his future if he cannot adjust to the changes. Acting as an individual, workers have little control over most of these factors. Through the efforts of three devices or groups, however, the worker can soften the impact of technological change: (1) unions, (2) collective bargaining, and (3) government legislation.

Unions

In order to challenge management and protect what he considers his individual rights in the organization, the worker presents an organized front in the form of a union. Unions have given the worker a voice to match against management's power. The theme of the unions in the 1960's has centered around the impact of technological change on the worker. This is different from the platform that existed in labor unions a few years back. During the 1930's, the unions desired only to be recognized. Their enrollment had fallen off considerably because of the pro-business atmosphere of the 1920's but a more

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[15]Speech given by Gordon Lippert, Director of Center for Behavioral Sciences, The George Washington University, to members of the Navy Graduate Financial Management Program (Washington: November 3, 1964).

favorable attitude toward labor was reflected in the election of the Democrats to office in 1932.[16] During World War II, when the unions in America came into full bloom, the stress was on increasing wages. After the war the "cry" of the unions shifted to "fringe" benefits with special emphasis on health insurance and pensions. "Today the problems of industrial relations appear to be expressed as a form of technological change."[17]

The official view of the national labor unions differs from that of certain local unions. Being isolated from the "personal" impact of the workers the national union leaders are able to see the long-run benefits derived from automation and technical progress. The local unions in areas that are affected by changing technology, however, will respond--and rightly so--to the cries of its members.

Collective Bargaining

Management and labor view each others' and their own rights in a different light. To air these differences and avoid strikes, management-labor negotiations are carried out in most industries. Problems such as advance notice and consultation, preferential employment rights, broadened seniority rights, training and retraining, and provisions for early retirement are aired and an agreement reached by both parties. All of these

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[16]McGuire, p. 112.

[17]Jack Barbash, "The Impact of Technology on Labor-Management Relations," Adjusting to Technological Change, p. 44.

areas of interests are means of cushioning the impact of technological change.

Government Legislation

Where management and labor are not able to reach agreements, the state and Federal governments have been stepping in to help. The extent of this aid will be discussed in the next chapter.

Summary

Because of technological progress, the labor force of today is enjoying higher wages with its resultant increase in the standard of living and still exerting less physical energy than its counterpart a decade ago. Some workers, however, are not enjoying the benefits of automation. They may lack the proper skills or education to cope with the more sophisticated machines and processes that increase production. Management will try to terminate this type of worker if there is no area where he is needed. Once an "unwanted" worker is dismissed, his natural resistance to move to another type of job or area where conditions are better is the reason, in many cases, why he joins the "hard-core" of the unemployed.

To counteract the impact of unemployment the worker uses an organized effort to persuade or coerce management into guaranteeing security. If this does not work, his only course of action is to strike and/or seek government aid.

Fear is the worker's worse enemy; and, in the worker's eye, technological progress is one of the initiators of this fear.

It is the fear of change and its ultimate consequence--unemployment--that has caused labor to resist technological innovations. This defensive attitude has slowed down technological progress, but this is unimportant to the worker who is fighting for his security.

CHAPTER IV

THE VIEWS OF THE FEDERAL GOVERNMENT

The previous chapters have shown how technological progress is viewed by management and labor. Management sees automation as the answer to its dream of maximum production with minimum costs while labor views it as the nemesis to its security. This chapter will show why the Federal Government has had to step into this picture of conflicting views on the part of management and labor. After a discussion on the causes of unemployment, the various programs of the Government will be viewed to show how it is attempting to alleviate both the short and long-run consequences of technological progress.

Government Intervention

The impact of automation has caused mounting public concern. Some people think that the problems that are involved are too great for labor and management to handle and that Government intervention and help is needed. One writer believes that technological change is a major factor that is making the present system of collective bargaining obsolete. He goes on to say that Government, representing the public interest, will step in and attempt to solve the problems that are beyond the

capabilities of management and labor individually.[1] This criticism of collective bargaining is perhaps unjustified. A ten-year study by the Industrial Relations Counselors revealed very little difficulty of labor and management adjusting to collective bargaining.[2]

Automation and changes in technology go beyond the confines of a single plant, company, or industry. This makes it impossible for local, state, or private efforts to be successful in solving a problem of this size. Because over-all economic growth is a National problem, the responsibility rests with the Federal Government to create conditions which will improve economic growth.[3]

The Government has generally agreed that ". . . continued rapid technological progress is essential to the economic strength of the Nation and to the achievement of further advances in levels of living for the American people . . ."[4] Changes in technology are a part of that progress, and industry and science are encouraged to develop new means of raising the standard of living and freeing man from tedious and menial tasks. The major concern of the Government, however, is the effect of the changes on the individual. ". . . The brunt of

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[1]Paul Jacobs, Old Before Its Time: Collective Bargaining at 28 (Santa Barbara: Center for the Study of Democratic Institutions, The Fund for the Republic, 1963), pp. 9-10.

[2]Beaumont, p. 301.

[3]"The Impact of Automation--A Challenge to America," AFL-CIO American Federationist, LXVIII, n. 8 (August, 1961), p. 13.

[4]Manpower Report of the President, 1964, p. 45.

the adjustment to technological change should not continue to fall on individual workers and their families but must be shared by society as a whole."[5]

The Council of Economic Advisers and President Johnson have stated that the present level of unemployment is too high.[6] It is hoped that current manpower programs of the Government will help reduce unemployment to an interim target of 4% of the civilian work force. These high levels of unemployment are causing concern as to the pace of technological change and its effects on employment opportunities. This concern has been caused, to a certain degree, by the displacement of workers which has taken place with the changeover to automation in some plants. Automation in some areas, however, has generated jobs and if the pattern of economic history holds true this effect will be the long-run outcome of our present dilemma. The role of the Government, then, is to help ease the short-run effects during this transitional period. The problem is one of concern for the primary resource of the world--manpower.

The Causes of Unemployment

The cause of the high unemployment rates of the past few years has revolved around two major approaches--the aggregate demand and the structural transformation theories.

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[5]Ibid.

[6]U.S., President, 1963- (Johnson), Economic Report of the President And Annual Report of the Council of Economic Advisers. (Washington: Government Printing Office, 1965), p. 39. Cited hereafter as Economic Report of the President - 1965.

Insufficient Aggregate Demand Theory

This theory is principally advocated by the President's Council of Economic Advisers which attributes the persistently high unemployment level to the traditional supply and demand analysis--i.e., a slow rate of economic growth results from a deficiency of the aggregate demand for goods and services. The growth rate is equal to the sum of the rate of change in the output per man-hour and the rate of change of the working population.[7] For example, if output per man-hour (productivity) was increasing 3.0 percent per year, and the work force 1.5 percent, then real Gross National Product (GNP) must increase 4.5 percent annually or unemployment will increase. Although GNP has been setting record highs every year since 1950, the increase has not been great enough to balance the rise in productivity. This disparity has caused a reduction in labor demand per unit of output and subsequently has retarded the growth of the working force. The Council of Economic Advisers advocate that tax reductions be the primary tool for helping to reduce unemployment. Reducing the tax introduces more money into the system and stimulates the economy. Other means such as improved education, training and retraining, and other measures could be used to accomplish a decrease in unemployment and would probably be necessary if the rate is to drop below 4 percent.[8]

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[7]Authur M. Ross (ed.), Unemployment and the American Economy (New York: John Wiley & Sons, 1964), p. 11.

[8]Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964, p. 27.

Structural Transformation Theory

This theory maintains a different reason for unemployment than the aggregate demand theory. Structural unemployment happens when technological changes happen too rapidly in the American economy. These changes cause increases in white-collar workers and decreases in blue-collar workers.[9] In capsulized form, the reasons for high unemployment, according to the structural theorists, are: (1) A faster rate of technological change has led to a higher rate of displacement of labor, (2) the average worker, once displaced, experiences a number of weeks of unemployment while hunting for a new job, (3) most of the displaced workers possess blue-collar backgrounds.[10]

Those who support this theory tend to focus on the individual rather than the economy as a whole. They argue that: (1) the unemployed are in localized areas or groups such as the unskilled and the young and as such it is hard to use the aggregate demand theory against these highly concentrated groups, (2) there are a greater number of people who have "given up" looking for a job than the figures show which would indicate that the impact of shutdowns and layoffs is greater than realized, and (3) a much higher level of demand will be necessary to create the same number of jobs where technological change has

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[9]William P. Lineberry, The Challenge of Full Employment (New York: H.W. Wilson Co., 1962), p. 52.

[10]U.S., Congress, Joint Economic Committee, Higher Unemployment Rates, 1957-60: Structural Transformation or Inadequate Demand, Subcommittee on Economic Statistics, 87th Cong., 1st Sess., 1961, p. 6.

replaced workers.[11]

Over the long-run, technological change and increased productivity have contributed to growth of the economy and expansion of employment opportunities so it would appear that both schools of thought are correct to a certain degree and each situation is probably present.

Manpower Legislation

Attempts by the Federal Government to reduce unemployment have been varied in years past. Recently, however, concerted efforts have been made to strengthen the Government's stand on this subject.

The Employment Act of 1946 placed Federal responsibility for employment levels, but was very weak in that it did not define maximum employment or set up policies for reaching a set goal. After a few false attempts in the 1950's to correct the residual unemployment that followed each recession, there was a renewed Government concern over the need for better matching between labor supply and labor demand. The first product of this concern was the Area Redevelopment Act of 1961 (ARA) which proclaimed to be in the national interest to restore prosperity to areas of chronic economic distress. The Manpower Development and Training Act (MDTA) of 1962 was intended to focus on retraining the experienced worker whose skills had been made obsolete by technological change. The recent trend of increasing

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[11]Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964, p. 28.

unemployment among youth, however, has shifted the emphasis on youth.

Until the passage of these acts, the historic outlook of the Federal Government regarding the labor market had been one that tried only to maintain the worker's income during brief periods of unemployment. The new concept under these laws is more ambitious. The attitude now is that unemployment compensation can be an effective tool to adjust the labor market and help assist the workers to the new patterns of demand for labor.[12]

A few writers believe that these recent bills could be effective tools to help depressed areas but that the Government needs to expand even more than in the past its policy on manpower and other means of attaining full employment. One criticism is that the hard-core unemployed are being by-passed in these Federal programs because they cannot pass the qualifying tests. Education--not training or retraining--is considered to be the first essential step to an effective program that will allow the unemployed to find a place in the labor markets.[13]

The Government also recognizes some of the weaknesses in the Manpower Development and Training Act and Area Redevelopment Act programs. Recent Congressional Subcommittee hearings suggested that the years of neglect which have accompanied rapid

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[12]Ross, p. 24.

[13]Seymour L. Wolfbein, "The First Year of the Manpower Act," Unemployment and the American Economy, ed. Authur M. Ross (New York: John Wiley & Sons, 1964), pp. 54-90.

change have created a backlog so great it would take years to eliminate it. In order to prevent further build-up, the subcommittee recommended that funds be made available to upgrade the skills of those who are in danger of unemployment.[14]

The minority (Republican) views in this matter are that the administration is concentrating only on mass or group unemployment and overlooks the needs and talents of the individual. They also believe that the present Manpower Development Training Act is weak and should play a more important role in facilitating adjustment to the technological revolution.[15]

Labor Mobility

Even though the labor force of the United States is the most mobile geographically of any industrial country, the average worker is still very reluctant to leave familiar surroundings. The Chamber of Commerce of the United States pointed out in 1961 that there would be adequate labor mobility if the displaced and the unemployed had sufficient labor market information about where to seek employment.[16] The Government is keenly aware of this problem but lacks the modern methods of data storage and retrieval coupled into a nationwide communications network to presently inform those concerned of alternative job opportunities. It is doubted if even this method

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[14]Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964, p. 91.

[15]Ibid., pp. 120-121.

[16]Automation and Unemployment, Chamber of Commerce of the United States (Washington: Chamber of Commerce, 1961), p. 26.

would cause certain groups to move from their present location, especially those who live in a community where labor is heavily dependent on a single dominant industry. Workers will usually cling to what little security they have as the industry declines and finally disappears.

Another group that is hard to move is the older worker who will do almost anything to retain his seniority and pension rights. In these times of high unemployment it is believed that every effort should be made to overcome geographic separation of qualified workers and available jobs.

Developing Manpower

No one knows how many job vacancies exist which cannot be filled for lack of skills. Present trends suggest that there will be continued and increasing demand for jobs requiring extensive education and training while at the same time the employment opportunities of the unskilled will decline. If the Council of Economic Advisers and other proponents of the aggregate demand theory are correct, the efforts spent by the Government to expand economic growth could very easily be thwarted by bottlenecks in the skills and highly trained manpower such an expansion might require.

Failure to develop skill potential not only threatens the individual with decreased employment opportunities but also affects his income and job satisfaction. By increasing the productivity of the individual, goods and services available to society are increased and will speed up the growth and

economic power of the country. Shortages of skilled and educated manpower can slow economic progress. "Careful studies at numerous universities have demonstrated repeatedly that the economic return to investment in human resources far exceeds returns to investment in capital equipment."[17]

Education

The primary responsibility of the educational system is to teach people to think, not to prepare them for employment. The role of education, however, is a part of and fundamental to employment in the increasingly complex technological world we live in today. This was not true in past generations where manual dexterity or physical strength was the only requirement for most jobs. These tasks, however, are the ones that are most susceptible to mechanization. The computer is now able to perform many repetitive mental tasks requiring very little education. "Man's superiority over the machine lies in his imagination, his rationality, and his emotional sensitivity, all in part products of education."[18]

One of the greatest deficiencies of our educational system is its inability, at present, to help those who need it the most. The youth who grow up in poverty also grow up in the low budgeted, inexperienced teacher school systems. After years of frustration they drop out--illiterate, untrained, and with no motivation.

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[17] Senate Committee on Labor and Public Welfare, Toward Full Employment, 1964, p. 76.

[18] Ibid., p. 78.

The Government is possibly the only element that can meet the problem of differences in educational opportunity among states and even within different areas of a state. The Manpower Development and Training Act is one step that has been taken by the Government to at least partially compensate for the deficiencies of basic education. This procedure, however, is more costly to the taxpayers than if a proper job had been done the first time.

In addition to elementary and secondary education aid, the Government also assists with programs for higher education. With the demand for professional manpower increasing at a rapid rate, the government believes that financial obstacles to higher education will have to be removed if the demands of the economy are to be met by 1970.

Monetary and Fiscal Policies

While monetary and fiscal policies seem off the subject, they cannot be overlooked because they are a basic factor in the cycle of our economy. The unfavorable balance of payments problems plaguing the Nation during the 1960's has restricted the use of monetary policies to stimulate the domestic economy. It has been the view of the Council of Economic Advisers that the rise in unemployment over recent years has been caused primarily from lack of sufficient demand for labor to absorb all of those seeking work. The primary tool of the Kennedy and Johnson administrations, therefore, has been the use of tax reduction and reform to speed the growth of total demand. The

tax cut of 1964 appears to have helped Gross National Product exceed that of 1963 by 6½ percent while the unemployment rate dropped from 5.5 in 1963 to 5.0 percent in 1964. While some progress was seen last year, there are still 3.7 million people seeking work.[19] The problem of unemployment still faces the nation.

Summary

The Federal Government views technological change with mixed emotions. On the one side it observes the fruitful nation-wide benefits that can be obtained from technological progress. The sharp increase in the standard of living since World War II can certainly be contributed to advances in technology. Any benefit though usually is attained at a price and the price, in this case, has been higher unemployment of the work force than that desired. Chief proponent of the aggregate demand theory of unemployment, the fiscal policies of the Government have been utilized in an attempt to reach full employment.

Manpower legislation such as the Manpower Development and Training Act and recent increased Federal aid to education have not made startling progress to date but programs of this nature represent an ambitious attempt by the Government to do something for those unfortunate enough to lack the skill or education to successfully compete in the labor market.

Where management and labor have failed to meet their responsibilities, the Federal Government has tried to pick up

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[19] Economic Report of the President - 1965, pp. 38-39.

the pieces--unwanted workers.

CHAPTER V

SUMMARY AND CONCLUSIONS

This paper has shown how yesterday's problems are still present today. The fear of the machine during the Industrial Revolution plagued the working class and the creation of the factory separated management and labor because of conflicting views. Management was looking for more profits, and this could be attained if the worker's job was taken over by a machine. The worker was looking for better working conditions and higher wages with which to raise his standard of living. Better still, his basic drive was for security.

Until the problem of unemployment was acute, the Government did very little to help the conflict. The depressions of 1921 and 1929 showed the Nation the personal impact of unemployment and made it aware of its responsibility to the individual. It has taken excessive unemployment the first half of this decade, however, to cause substantial efforts of a corrective nature to be initiated. But the conflicting views of each participant in this technological revolution is still present.

Management Reviewed

Along with the desire to make a profit, every business organization has a basic objective to remain viable. In order

to accomplish these goals, management has been striving to complete its dream of an automatic factory--one that will be entirely integrated from beginning to end. This feat cannot be accomplished in one step but involves a series of changes. Adjusting to these changes has been difficult for management for it has been reaching into the unknown. Some mistakes have been made but it is known that long-range planning is the key to success. Because of this long-range outlook management has, in some cases, ignored the short-run consequences. This lack of foresight and disregard for the present has caused considerable reactions from the worker.

Labor Reviewed

If management does not announce impending innovations, the impacts of these changes can make adjustment very difficult for the worker. It is the fear of change and its ultimate consequence--unemployment--that has caused labor to resist technological innovations. This short-range outlook has slowed down technological progress, but this is unimportant to the worker who is fighting for his security. Reduction of the labor forces also has caused labor unions to become concerned for their future, and they are helping by resisting any changes that will affect the working force. Labor's plight can be summed up as one of fear and resistance to change.

Government Reviewed

Little is heard of technological change or the unemployment effects of automation in periods of labor shortage. The

excessive unemployment rates of the 1960's have caused enough public concern to warrant considerable Government participation and sponsorship of programs to help soften the impacts of technological change. In most cases the Federal Government is the only party with enough power to accomplish the necessary steps to full employment. Having accepted the responsibility for the economic growth of the Nation and the plight of the worker society will not accept, the Government has initiated a two-pronged attack on unemployment. The short-run programs are helping those unfortunate enough to lack the skill or education to successfully compete in the labor market. The long-run attack aims at the very heart of the educational system itself and is concerned with the deficiencies of basic education.

The role of the Government, then, is to fill in the gaps where management and labor either cannot or will not make adjustments to technological change.

Conclusions

The paradox of this age of automation is that so far it has produced defensive reactions on the part of its participants, even though the benefits are known to be bountiful. Labor reacts with fear and resistance to change. The Government, in spite of its desire to increase economic growth, often slows down the process when it reacts to help the short-run consequences of automation. Even management resists change to a certain degree when the very core of the organization is affected by automation.

Resistance to change cannot be tolerated because technological change is tied to the Nation's long-term economic growth. In order to continue forward as a strong Nation, each group--management, labor, and Government--must recognize and assume its particular responsibilities as they apply to technological change.

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